Indigenous Ecological Knowledge and Modern Western Ecological Knowledge: Complementary, not Contradictory

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Abstract

Indigenous knowledge is often dismissed as 'traditional and outdated', and hence irrelevant to modern ecological assessment. This theoretical paper critically examines the arguments advanced to elevate modern western ecological knowledge over indigenous ecological knowledge, as well as the sources and uses of indigenous ecological knowledge. The central argument of the paper is that although the two systems are conceptually different, it would be fallacious to regard one as superior to the other merely because they are premised on different worldviews.

Key words

Worldview, indigenous ecological Knowledge, western ecological knowledge, African Philosophy

Introduction

Various groups of people in different parts of the world perceive and relate with the environment in their own peculiar ways. Their divergent perceptions, interactions and knowledge are largely determined by their different worldviews and their environmental ethics. Indigenous ecological knowledge may be considered as a subset of the wider Indigenous knowledge, and it is always specific to a particular community. For many traditional communities, Indigenous knowledge forms a holistic worldview, which is inseparable from their very ways of life - their cultural values, spiritual beliefs and customary legal systems.

Indigenous Ecological Knowledge (IEK) is a cumulative body of information, beliefs and practices evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment (Berkes *et. Al.* 2000). The advent of globalization, with its emphasis on modern science and technology, has led to this form of knowledge being either subsumed in the western concept of 'knowledge for sustainable development', or ignored altogether. The irony is that most of the developments in science and technology, which are at the core of globalization and "civilization", have their roots in Indigenous knowledge. This is why there is an increasing interest in Intellectual property rights for the owners of indigenous knowledge- the indigenous people. Interest in Indigenous Ecological Knowledge has been growing in recent years, partly due to a recognition that such knowledge can contribute to the conservation of biodiversity (Gadgil *et. Al.* 1993).

The question of the viability of indigenous knowledge cannot be answered adequately without addressing the prior question of whether or not indigenous people exist. Since indigenous people exist, it is undeniable that indigenous knowledge exists as well. Based on their own locally developed practices of resource management, indigenous groups offer alternative perspectives to modern Western Science- oriented knowledge systems. Advocates of IEK have promoted its use in scientific research, impact assessment and ecological understanding. However, the 'mainstream' application of IEK-derived insights remains elusive, in part due to the difficulty of accessing IEK, which is rarely written down. What is more, there has been a consistent bias towards modern western ecological knowledge over Indigenous ecological knowledge.

This theoretical paper contends that indigenous and modern western ecological knowledge systems, though premised on different worldviews, have some inherent similarities that can be harnessed to assess and understand the environment from a broad perspective. Its central argument is that instead of sidelining, ignoring or dismissing indigenous ecological knowledge as 'traditional and obsolete', its strengths should be embraced to complement modern western ecological knowledge. Science and technology can effectively be used to assimilate and entrench indigenous knowledge in the "global village" and into the 'mainstream' knowledge systems in order to debunk the belief that the modern western oriented knowledge system is the only viable one.

More specifically, the paper seeks to answer the following questions:

* What is the conceptual difference/similarity between Indigenous Ecological Knowledge (IEK) and modern Western Ecological Knowledge?
* Is IEK compatible with modern Western ecological knowledge?
* How can the two knowledge systems complement one another in understanding the environment?

The paper is divided into three main sections. The first section highlights the attempt of Eurocentric scholarship to sideline indigenous knowledge. The second offers a conceptualization of indigenous ecological knowledge (IEK), while the third argues for the compatibility of IEK and modern western Ecological knowledge for assessing and managing the environment.

Indigenous Knowledge: The Struggle for Relevance in Contemporary Society

For a long time, Indigenous Knowledge has been understood as being in binary opposition to 'western', 'scientific' or 'modern' knowledge. Eurocentric scholars have often dismissed Indigenous Knowledge in the same way they dismissed any socio- political or cultural aspect they did not understand (Battiste 2002). Such scholars are of the view that Indigenous knowledge is unsystematic and incapable of meeting the productivity needs of the modern world. Initial studies of indigenous knowledge and its analogues such as 'traditional', 'local' or 'practical' sought to underline its differences from scientific knowledge and its analogues such as 'western', 'rational', 'abstract' or 'modern' along a variety of methodological and contextual criteria (Agrawal 2002; Battiste 2002).

According to Battiste (2002, 33), Eurocentric scholars have taken three main approaches to indigenous knowledge. *First*, they have tried to reduce it to taxonomic categories that are static over time. *Second*, they have attempted to reduce it to its quantifiably observable elements. *Third*, they have assumed that Indigenous knowledge has no validity except in the 'spiritual' realm. Battiste further observes that none of these approaches adequately explains the holistic nature of indigenous knowledge or its fundamental importance to indigenous people. In Eurocentric thought, indigenous knowledge is often conveniently represented as 'traditional knowledge', connoting a body of relatively old information that has been handed down from generation to generation essentially unchanged, hence dismissed as obsolete.

What is more, indigenous knowledge is often regarded as existing in a local context, anchored on a particular social group in a particular setting at a particular time. Western modern knowledge, on the other hand, is often regarded as stemming from an epistemic framework committed to the search for universal validity (Banuri and Apffel-Marglin 1993). Local indigenous knowledge is often seen

as “primitive, unscientific and a cultural commodity lacking in objectivity and credibility”, whereas western ‘scientific’ knowledge is seen as “contemporary, objective and universally true hence more credible” (Kaplan & Kaplan 1982).

For some scholars, the difference between Western (modern) knowledge and indigenous (traditional) knowledge is that the former is open, systematic, objective and analytical, advancing by building rigorously on prior achievements. Indigenous knowledge, on the other hand, is closed, non-systematic, holistic rather than analytical, and proceeds on the basis of new experiences, rather than on the basis of a deductive logic (Levi-Strauss 1962; Howes & Chamber 1980; Feyerabend 1987; Berkes *et*. *Al*. 2000). Levi-Strauss (1962, 269) argued that these two ways of knowing are two parallel modes of acquiring knowledge about the universe: the two sciences are fundamentally distinct in that "the physical world is approached from opposite ends in the two cases: one is supremely concrete (indigenous knowledge), the other supremely abstract (modern science)". Paul Feyerabend (1987) also distinguished between these two traditions of thought: abstract traditions (to which scientific ecology belongs) and historical traditions, which include systems of knowledge possessed by people outside Western science - knowledge that often becomes encoded in rituals and in the cultural practices of everyday life.

There are fundamental differences between indigenous knowledge and western scientific knowledge. Indigenous knowledge is recorded and transmitted through oral tradition, whereas western science employs the written word. Indigenous knowledge is also holistic: all elements of nature are viewed as interconnected and incomprehensible in isolation, whereas western science is reductionist - deliberately breaks down data into smaller elements to understand the whole and complex phenomenon (Johnson 1992, 7). It is for the reasons above that indigenous knowledge is often represented as the binary opposite of western science.

However, some advocates of indigenous knowledge (Agrawal 1995, 2002; Battiste 2002; Cassie 2009) contend that just like colonization, a Eurocentric attitude to knowledge has conveniently threatened indigenous knowledge. They further urge that given the failure of numerous philosophers of science, including Leibniz, Popper, Carnpa and Lakatos, to find satisfactory demarcation criteria between science and non-science, it is perhaps unnecessary to draw clear lines between Western (modern) and Indigenous knowledge systems (Bhola 2002). Instead, each should be treated as valid and practical in its own right, and neither should be treated as inferior to the other. Moreover,

advocates of Indigenous Knowledge have asserted that it is much more than the binary opposite of western modern knowledge. They have argued that as a concept, Indigenous Knowledge benchmarks the limits of Eurocentric theory - its methodology, evidence and conclusions. It reconceptualizes the resilience and self reliance of indigenous people, and underscores the importance of their own philosophies, heritages and education processes (Battiste 2002, 30).

Besides, according to Tangwa (2004), Western science and technology is largely anthropocentric and individualistic unlike traditional ecological worldviews, which regard mankind as inseparable from nature. For Tangwa, this difference in world views explains why traditional Africans were more cautious in their attitude to plants, animals and inanimate things and the various invisible forces in the world (Tangwa 2004, 389). He notes that traditional Africans were more disposed towards the attitude of "live and let live". This is in contrast to western ecological knowledge, which views the natural environment merely in terms of its potential to meet the needs of mankind.

One of the most devastating critiques of modern technical solution-oriented development policies of the last five decades of the twentieth century was that they ignored the social, political and cultural contexts in which they were implemented. If this is true, , it is likely that the so-called technical solutions were as anchored in a specific milieu as any other system of knowledge (Agrawal 1995, 4). Furthermore, by dismissing the validity of indigenous knowledge, Eurocentric scholars disregard the fact that indigenous communities have their own knowledge holders and workers. They also overlook the fact that indigenous people have their own methods of classifying and transmitting knowledge just as they have individual ways of sustaining their livelihoods from the environment (Battiste 2002). The bias towards the western idea of truth and objectivity subsumes indigenous knowledge systems into the western notions of knowledge. This in effect means that the autonomy and diversity of the rich indigenous knowledge systems is lost as they continue to be assigned an inferior status to western-based science and technology (Cassie 2009).

Conceptualising Indigenous Ecological Knowledge

The dialectic between indigenous and modern knowledge mainly centers on whether indigenous knowledge is credible enough to be consulted or considered in resolving pertinent human problems such as environmental degradation, health challenges, food security and conflict resolution, among others. To adequately address the concerns raised about the credibility and viability of indigenous knowledge in contemporary discourse, it would be prudent to answer two key questions:

* What is knowledge?
* What does it mean to say that knowledge is indigenous?

In cultural- constructivist theories, to know is to become cognizant, or have a concept of, something in the mind through seeing and/or hearing, and, in literate societies, through reading. The term knowledge has therefore come to have connotations of facticity, certainty and truthfulness (Bhola 2002, 3).

On its part, epistemology refers to the study of theories about the nature and scope of knowledge, the evaluation of the presuppositions and bases of knowledge, and the scrutiny of knowledge claims (Coetzee &Roux 2002). However, the means and bases of knowledge claims vary from culture to culture. For instance, the way a member of an indigenous African community comes to know or claims to know that such and such is the case may differ from the way in which a modern European would claim to come to know. Besides, African indigenous ways of knowing are as diverse as the numerous ethnic communities in the continent. Nevertheless, by its very nature, epistemology is universal - it studies knowledge and knowledge systems irrespective of their origins.

> The term 'indigenous knowledge' denotes the traditional understanding of a community which has originated, grown and lived in a specific area (WIPO 2001, 23). Indigenous knowledge is therefore 'naturally possessed' by a particular community, and its content may be as broad as human experience: from history, to astronomy, biology, health and agriculture. The process of validation of this form of knowledge involves its use and usefulness in the real world (Bhola 2002,11).

Unlike western science, which is knowledge about *how* to live, indigenous knowledge is a *way of life:* it is the actual living of that life (Johnson 1992; Nakashima 1993). According to the World Intellectual Property Organization (WIPO), traditional (indigenous) knowledge can be defined as follows:

> … tradition based literary, artistic or scientific works, inventions, performances, scientific discoveries, designs, marks, names and symbols and all other tradition- based innovations and creations resulting from intellectual activity in the industrial, scientific, literary and artistic fields. Categories of traditional knowledge could include: agricultural knowledge, scientific knowledge, ecological knowledge, medicinal knowledge … (WIPO 2001, 25).

Indigenous knowledge is an adaptable, dynamic system based on skills, abilities and problem-solving techniques that change over time depending on environmental conditions: it is holistic in nature (WIPO 2001).

In this paper, the term 'indigenous knowledge' is used to refer to multifaceted bodies of knowledge, practices and representations that are developed and maintained by peoples with long histories of

close interaction with the local natural environment (Owuor 2007). In this sense, the adjective 'indigenous' expresses the idea that such knowledge is typical and belongs to peoples from specific places with common cultural and social ties. Such a definition reflects the uniqueness of ways in which specific societies make sense of the world, conceptualise local problems and offer solutions that are context specific (Owuor 2007, 24).

On its part, indigenous ecological knowledge (IEK) includes a system of classification, a set of empirical observations about the local environment, and a system of self- management that governs resource use. It therefore constitutes an indigenous community's adaptive strategy. With its roots firmly in the past, indigenous ecological knowledge is cumulative and dynamic, building upon the experiences of earlier generations and adapting to the current technological and socioeconomic realities. An analysis of many Indigenous Ecological Knowledge systems shows that there is a component of local observational knowledge of species and other environmental phenomena, a component of practice in the way people carry out their resource use activities, and a component of belief regarding how people fit into or relate to eco-systems (Berkes *et. al*. 2000, 1252).

The intellectual roots of IEK are in ethno science (mainly ethno botany) and human ecology. The field started with the documentation of lists of species used by different indigenous groups, and elaborated a science of folk taxonomies of plants and animals, and later of other environmental features such as soils (Berkes 1999). Early ethno botany goes back at least to Barrows' 1900 work on Coahuila Indians of Southern California, who made a living in a seemingly barren desert environment by harvesting no less than 60 kinds of edible plants and 28 kinds of medicinal plants. The science of folk taxonomies is often associated with the name of Harold Conklin, who documented in the 1950s the extensive plant knowledge and classification systems of traditional groups such as the Hanonoo of the Philippines (Johnson 1992).

IEK is captured in practices and oral literary works such as music and folklore (WIPO 2001). Children from young ages are taught through narratives and rituals that plants are a source of medicine, food and building materials, among others. For example, in indigenous Kenyan communities, many people believed that forests were the manifestation of the power of the Supreme Being. Most of these communities had shrines associated with big trees such as fig trees and baobabs, which, together with the vegetation around them, were set apart as places of worship (Kipury 1983). Among the Agĩkũyũ, for instance, shrubs, grass and forests were regarded as valuable gifts from God. They respected big trees, especially the *mũgumo* (fig tree) as a place to meet God. Thus sacrifices and offerings were done under the *mũgumo*. Up to the present time, it is a

taboo to cut a *mũgumo* in this community, because it is still regarded as sacred (Kabira and Mutahi 1993). Respect for the environment was no different among the Akamba community, who also preserved trees for medicinal and spiritual purposes (Odaga 1984). Among the Maasai, trees and shrubs are respected because they provide shade for various social gatherings. Furthermore, being pastoralists, the Maasai highly value grass as a blessing from God for their animals. They also use trees for certain purification rituals, and protect such trees (Kipury 1983).

As Odaga (1984, 9) observes, oral literature acts as a vehicle of communication, conveying cultural values, wisdom, philosophy, history, knowledge and skills. Oral narratives reflect the philosophy and values of the society that produces them (Kabira and Mutahi 1993, 10). The sacredness of nature as the sustainer of human life was captured in the different literary works in a particular community. In this regard, Chesaina (1997) notes:

> Oral literary works are intricately related to the social environment of the people who create and perform them … the universe is a complex phenomenon and human beings need to understand it in order to build a niche for themselves in it. Oral literature helps people to understand the natural environment and their place within the environment (Chesaina 1997, 40).

Traditional ecological education transmitted orally from generation to generation focused on preserving the sacredness of life and whatever enhanced it. Contemporary ecological education should therefore draw insights from this system of education (Battiste 2002).

Farming practices among different indigenous communities in Kenya also bear witness to the fact that indigenous knowledge can be harnessed to combat environmental degradation. Farmers have since time immemorial used intercropping and rotational cropping to improve soil fertility and as a pest control mechanism. This used to work effectively before the introduction of pesticides and fertilizers which have had a negative impact on the environment (Misiko 2007).

Indigenous and Western Ecological Knowledge: Complementary, not Contradictory

Indigenous and western ecological knowledge are not fundamentally different. Both are ultimately based on empirical observations of the environment, and both result from the rational process of creating order from disorder as a survival mechanism (Agrawal 2002). Although IEK may have some religious and cultural views on the environment which may not make sense to western science, they are still an integral part of understanding and preserving the environment (Johnson

1992, 10). As such, attempts to draw a clear line between scientific and indigenous knowledge on the basis of method, epistemology, context or content are ultimately untenable (Agrawal 2002). Globalization should therefore be effectively used to assimilate and entrench indigenous knowledge into the "global village" knowledge systems in order to debunk the belief that the western oriented knowledge system is the only viable approach to the global environmental crisis.

Although epistemology as the study of knowledge is universal, ways of acquiring knowledge vary according to the socio- cultural contexts within which knowledge claims are formulated and articulated (Coetzee & Roux 2002). Deconstructing local/indigenous knowledge to understand how it is acquired establishes common ground for bridging the epistemological gap that occurs when people with different worldviews are working together on a common issue (Kaplan & Kaplan 1982).

From the 1970s, a growing number of scholars and United Nations organizations turned their attention to exploring how indigenous knowledge and institutions could contribute to more culturally appropriate and sustainable development (Dei 2002; UNESCO 2006). In 1999, the World Conference on Science Assembly under the auspices of UNESCO and the International Council for Science (ICSU) urged governments to promote the understanding of indigenous knowledge systems. Conference participants asked the sciences to respect, sustain and enhance traditional knowledge systems, and recommended that scientific and traditional knowledge be integrated into interdisciplinary projects dealing with links in culture, environment and development (Battiste 2002, 32). What is more, the *UN Convention on Biological Diversity* acknowledges the importance of indigenous knowledge in the conservation and sustainable use of biodiversity, and recognizes the validity of indigenous science in modern environmental studies (Battiste 2002).

The world today is facing numerous environmental problems. Self-interested human activities on the environment have had a negative impact on human beings and other life forms. We are witnessing more pollution, soil erosion, droughts, deforestation and even desertification. Individualistic and utilitarian attitudes towards nature have led people to plunder the environment recklessly (Banuri and Apffel-Marglin 1993). There is therefore need to complement the 'conventional' Western-oriented wisdom of relating with the environment with the traditional if we are to find a comprehensive solution to the spiraling environmental degradation.

There is a growing consensus that some of the solutions to problems that currently plague African societies must proceed from understanding the dynamics within local contexts. Such dynamics

include the role of indigenous knowledge and practices in the development processes (WIPO 2001; Dei 2002; UNESCO 2006). This shift of paradigm arises from the recognition of the need to address the deficiencies of an understanding of development formulated in the western context. With the integration of local knowledge that is appropriate to the needs of indigenous communities, it is hoped that local problems can be addressed more effectively (Owuor 2007).

As Mander (1991) noted, science and technology, which are aspects of globalization, are believed to be the cause of the many environmental problems we are facing today, and it is time Western science realized the faults in its own knowledge system and recognized the value of other knowledge systems in addressing global environmental concerns. Western-oriented science and technology, on their own, cannot get us out of the messy situation we are in now. Other approaches are required, especially ones with long, successful track records as indigenous ecological knowledge (Blaser *et. Al*. 2004).

Although indigenous ecological knowledge is increasingly being recognized as a suitable alternative approach to promoting environmental sustainability in both academic circles and policy formulation fora, there are still doubts and heated debates about its viability. There are perceptions about the dichotomies between local indigenous knowledge and the western 'scientific' knowledge: this is an attitude problem. There are also the practical problems of trying to reconcile two very different worldviews, and attempting to translate ideas and concepts from one culture to another (Johnson 1992, 10). With the consistent bias towards 'modern western knowledge' as the only viable knowledge system, Indigenous knowledge of the environment is being lost in communities around the world. There is therefore an urgent need to utilize this knowledge in developing mechanisms for protecting the earth's biological diversity.

Furthermore, indigenous ecological knowledge systems are a source of inspiration for environmental ethics. As earlier noted, the belief systems of most indigenous communities incorporate the idea that human beings have a symbiotic relationship with nature. This metaphysical outlook can be used to inculcate into the public a more caring attitude towards the environment. It is therefore erroneous to believe that western science and technology is the only valid approach to resolving environmental problems.

Thus Indigenous ecological knowledge should be used to contribute to conceptual pluralism and expand the range of approaches and information needed to solve environmental problems. In this way, it will challenge the long hegemony of western knowledge over policy formulation in non-western contexts. As such, academics and policy makers need to understand that the western science based 'global' knowledge system is only one knowledge system among many. Harding (1991) asserted that modern science has its roots in African, Asian and other third world indigenous cultures. As controversial as Harding's claim may be, modern science needs to appreciate the fact that indigenous people do have something to offer and whatever it is, it should not be dismissed simply because it does not fit into the western intellectual framework of knowledge and truth.

Conclusion

This paper has argued for the need for a new and more comprehensive understanding of indigenous knowledge in its specific context. It has called for a conceptual framework within which to view indigenous ecological knowledge - one that goes beyond the imposition of one worldview upon the other, and which instead transcends epistemological differences between them. The paper has also contended that indigenous ecological knowledge should be seen as credible in its own right, and not as knowledge that requires validation by the standards of western science. What is more, the two knowledge systems should not be viewed as mutually exclusive, but rather as complementary by focusing on points of agreement rather than disagreement.

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